

Appl. No.: 10/723,956
Reply to Office Action of: April 26, 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the present application:

1. (currently amended) A tape feeder for advancing a component-carrying tape to present sequential electronic components disposed in the tape at a pitch for assembly, the tape feeder comprising:

a feed sprocket and an encoder disc operatively associated with each other and rotatably disposed on a common axis;

a motor operatively connected to the feed sprocket to repetitively rotate the feed sprocket over an angle corresponding to the pitch of the component-carrying tape; and

an encoder disposed to read the encoder ~~disk~~ disc and provide a feedback signal indicating the angular position of the feed sprocket; and

the encoder disc having two rings of lines, the first ring having a line spacing corresponding to the pitch of the component-carrying tape, and the second ring having a line spacing less than the pitch of the component-carrying tape.

2. (original) The tape feeder of claim 1 further comprising a worm gear operatively associated with the feed sprocket and encoder disc and rotatably disposed on their common axis to impart angular velocity of the worm gear to the feed sprocket and the encoder disc.

3. (original) The tape feeder of claim 2 further comprising a worm shaft coupled to the motor and engaged with the worm gear.

4. (original) The tape feeder of claim 2 wherein the feed sprocket and the encoder disc are attached to the worm gear.

Appl. No.: 10/723,956
Reply to Office Action of: April 26, 2005

5. (original) The tape feeder of claim 4 wherein the feed sprocket and the encoder disc are fastened to a hub of the worm gear.

6. (original) The tape feeder of claim 1 wherein an upper tape feed track directs the component-carrying tape into engagement with the feed sprocket.

7. (original) The tape feeder of claim 6 further comprising a housing, wherein the upper tape feed track is formed in the housing and the motor, feed sprocket and encoder disc are mounted in the housing.

8. (original) The tape feeder of claim 7 wherein the housing has a window formed therein positioned in communication with the upper tape feed track to allow removal of components from the component-carrying tape.

9. (original) The tape feeder of claim 8 wherein the window is positioned proximate the engagement of the feed sprocket and the component-carrying tape.

10. (cancelled)

11. (currently amended) The tape feeder of claim 1 wherein the feed sprocket has a number of teeth thereon and the encoder ~~disk~~ disc has a ring of discrete lines at essentially uniform angular spacing, the lines being of a substantially greater number than the number of teeth on the feed sprocket.

12. (original) The tape feeder of claim 11 wherein the encoder disc has a ring of about 2500 lines.

13. (original) The tape feeder of claim 1 wherein the axis of rotation of the worm gear is defined by a pair of ball bearings.

14. (original) The tape feeder of claim 13 wherein the ball bearings are biased in the axial direction to remove radial and axial play.

Appl. No.: 10/723,956
Reply to Office Action of: April 26, 2005

15. **(withdrawn)** The tape feeder of claim 1 further comprising a pull-off wheel for removing a cover tape from the component-carrying tape.

16. **(withdrawn)** The tape feeder of claim 15 wherein the pull-off wheel has a tire thereon formed of a resilient material.

17. **(withdrawn)** The tape feeder of claim 15 wherein the pull-off wheel is rotated by a belt riding in a groove in the worm gear.

18. **(withdrawn)** The tape feeder of claim 16 wherein the cover tape is biased against the tire by a spring wheel.

19. **(newly added)** The tape feeder of claim 11 wherein the second ring has a number of lines which is at least 10 times greater than the number of teeth.

20. **(newly added)** The tape feeder of claim 19 wherein the encoder has a quadrature output to multiply a number of encoder pulses into a higher number of counts.

21. **(newly added)** The tape feeder of claim 19 wherein angular position and speed of the feed sprocket are determined by an output of the encoder reading the two rings of lines on the encoder disc.